

**QA:** Abbreviation for **quality assurance**.

**QAM:** Abbreviation for **quadrature amplitude modulation**.

**QC:** Abbreviation for **quality control**.

**QOS:** Abbreviation for **quality of service**.

**QPSK:** Abbreviation for **quadrature phase-shift keying**.

**quad:** A group of four wires composed of two pairs twisted together. *Note:* The pairs have a fairly long length of twist and the quad a fairly short length of twist. (188)

**quadded cable:** A cable formed of multiples of quads, paired and separately insulated, and contained under a common jacket. (188)

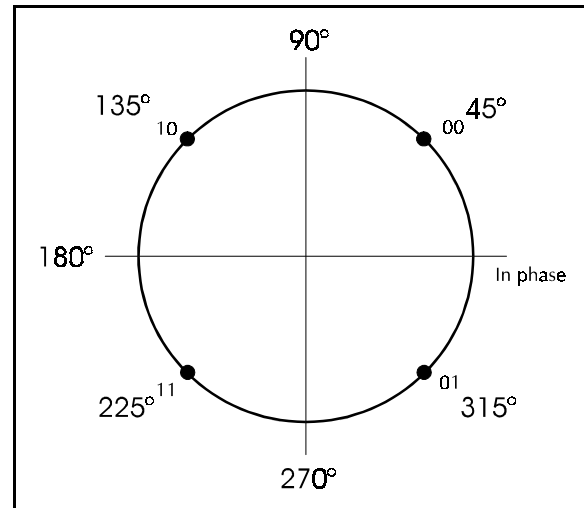
**quadratic profile:** *Synonym* **parabolic profile**.

**quadrature:** **1.** The state of being separated in phase by  $90^\circ$  ( $\pi/2$  radians). **2.** Pertaining to the phase relationship between two periodic quantities varying with the same period, that is, with the same frequency or repetition rate, when the phase difference between them is one-quarter of their period. (188)

**quadrature amplitude modulation (QAM):** Quadrature modulation in which the two carriers are amplitude modulated. (188)

**quadrature modulation:** Modulation using two carriers out of phase by  $90^\circ$  and modulated by separate signals. (188)

**quadrature phase-shift keying (QPSK):** Phase-shift keying in which four different phase angles are used. (188) *Note:* In QPSK, the four angles are usually out of phase by  $90^\circ$ . *Synonyms* **quadriphase**, **quaternary phase-shift keying**.



quadrature phase-shift keying

**quadriphase:** *Synonym* **quadrature phase-shift keying**.

**quadruple diversity:** In radio communication, diversity transmission and reception in which four independently fading signals are used. *Note:* Quadruple diversity may be accomplished through the use of space, frequency, angle, time, or polarization multiplexing, or combinations of these. (188)

**quadruply clad fiber:** A single-mode optical fiber that has four claddings. *Note 1:* Each cladding has a refractive index lower than that of the core. With respect to one another, their relative refractive indices are, in order of distance from the core, lowest, highest, lower, higher. *Note 2:* A quadruply clad fiber has the advantage of very low macrobending losses. It also has two zero-dispersion points, and moderately low dispersion over a wider wavelength range than a singly clad fiber or a doubly clad fiber. *See illustration under refractive index profile.*

**quality assurance (QA):** **1.** All actions taken to ensure that standards and procedures are adhered to and that delivered products or services meet performance requirements. (188) **2.** The planned systematic activities necessary to ensure that a component, module, or system conforms to established technical requirements. **3.** The policy, procedures, and systematic actions established in an enterprise for the purpose of providing and maintaining a specified

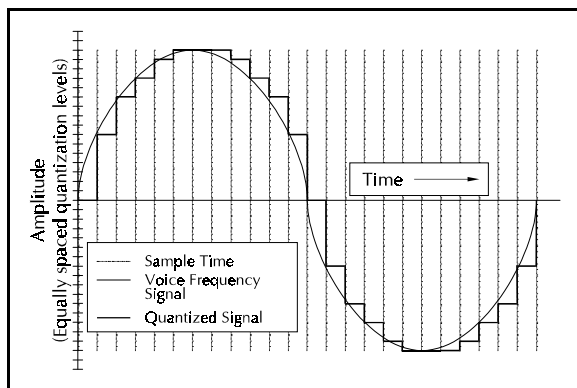
degree of confidence in data integrity and accuracy throughout the lifecycle of the data, which includes input, update, manipulation, and output.

**quality control (QC):** A management function whereby control of the quality of (a) raw materials, assemblies, produced materiel, and components, (b) services related to production, and (c) management, production, and inspection processes is exercised for the purpose of preventing undetected production of defective materiel or the rendering of faulty services. (188)

**quality factor:** In a reactive circuit, the ratio of the reactance in ohms divided by the resistance in ohms.

**quality of service (QOS):** 1. The performance specification of a communications channel or system. (188) *Note:* QOS may be quantitatively indicated by channel or system performance parameters, such as signal-to-noise ratio (S/N), bit error ratio (BER), message throughput rate, and call blocking probability. 2. A subjective rating of telephone communications quality in which listeners judge transmissions by qualifiers, such as excellent, good, fair, poor, or unsatisfactory.

**quantization:** A process in which the continuous range of values of an analog signal is sampled and divided into nonoverlapping (but not necessarily equal) subranges, and a discrete, unique value is assigned to each subrange. *Note:* An application of quantization is its use in pulse-code modulation. If the sampled signal value falls within a given subrange, the sample is assigned the corresponding discrete value for purposes of modulation and transmission. (188)



quantization

**quantization error:** *Synonym* quantizing distortion.

**quantization level:** In the quantization process, the discrete value assigned to a particular subrange of the analog signal being quantized. (188)

**quantization noise:** *Synonym* quantizing noise.

**quantized feedback:** In a digital feedback loop, the digital signal that is fed back. (188) *Note 1:* Several forms of analog-to-digital converters contain a quantized feedback loop following the basic A-D converter. *Note 2:* The feedback signal is often processed before introducing it to the loop.

**quantizing distortion:** Distortion that results from the quantization process. (188) *Synonym* quantization error.

**quantizing levels:** In digital transmission, the number of discrete signal levels transmitted as the result of signal digitization. (188)

**quantizing noise:** Noise caused by the error of approximation in quantization. (188) *Note:* Quantizing noise is dependent on the particular quantization process used and the statistical characteristics of the quantized signal. *Synonym* quantization noise.

**quantum efficiency:** In an optical source or detector, the ratio of the number of output quanta to the number of input quanta. *Note:* Input and output quanta need not both be photons.

**quantum-limited operation:** *Synonym* quantum-noise-limited operation.

**quantum noise:** Noise attributable to the discrete and probabilistic nature of physical phenomena and their interactions. *Note 1:* Quantum noise represents the fundamental limit of the achievable signal-to-noise ratio of an optical communication system. This limit is never achieved in practice. [After FAA] *Note 2:* Examples of quantum noise are photon noise in an optical signal and shot noise in an electrical conductor or semiconductor.

**quantum-noise-limited operation:** Operation wherein the minimum detectable signal is limited by quantum noise. (188) *Synonym* quantum-limited operation.

**quarter common intermediate format (QCIF):** A video format defined in CCITT Recommendation H.261 that is characterized by 176 luminance pixels on each of 144 lines, with half as many chrominance pixels in each direction. (188) *Note:* QCIF has one-fourth as many pixels as the full common intermediate format.

**quartz clock:** A clock containing a quartz oscillator that determines the accuracy and precision of the clock.

**quartz oscillator:** An oscillator in which a quartz crystal is used to stabilize the frequency. *Note:* The piezoelectric property of the quartz crystal results in a nearly constant output frequency, which is dependent upon the crystal size, shape, and excitation.

**quasi-analog signal:** A digital signal that has been converted to a form suitable for transmission over a specified analog channel. (188) *Note:* The specification of the analog channel should include frequency range, bandwidth, signal-to-noise ratio, and envelope delay distortion. When quasi-analog form of signaling is used to convey message traffic over dial-up telephone systems, it is often referred to as voice-data. A modem may be used for the conversion process.

**quasi-analog transmission:** Transmission in which a special-purpose modulator is used to convert digital signals into an analog form suitable for transmission over an analog voice-grade circuit. *Note:* A complementary demodulator is used to recover the digital signal at the other end of the circuit. (188) *See modem.*

**quaternary phase-shift keying:** *Synonym*  
**quadrature phase-shift keying.**

**quaternary signal:** A digital signal having four significant conditions.

**query call:** In adaptive high-frequency (HF) radio, an automatic-link-establishment call that requests responses from stations having connectivity to the destination specified in the call. (188)

**queue:** A set of items, such as telephone calls or packets, arranged in sequence. *Note:* Queues are used to store events occurring at random times and to

service them according to a prescribed discipline that may be fixed or adaptive.

**queue traffic:** **1.** A series of outgoing or incoming calls waiting for service. (188) **2.** In a store-and-forward switching center, the outgoing messages awaiting transmission at the outgoing line position. (188)

**queuing:** The process of entering elements into or removing elements from a queue. (188)

**queuing delay:** **1.** In a switched network, the time between the completion of signaling by the call originator and the arrival of a ringing signal at the call receiver. (188) *Note:* Queues may be caused by delays at the originating switch, intermediate switches, or the call receiver servicing switch. **2.** In a data network, the sum of the delays between the request for service and the establishment of a circuit to the called data terminal equipment (DTE). **3.** In a packet-switched network, the sum of the delays encountered by a packet between the time of insertion into the network and the time of delivery to the addressee. (188)

**queuing theory:** The theoretical study of waiting lines, expressed in mathematical terms—including components such as number of waiting lines, number of servers, average wait time, number of queues or lines, and probabilities of queue times' either increasing or decreasing. *Note:* Queuing theory is directly applicable to network telecommunications, server queuing, mainframe computer queuing of telecommunications terminals, and advanced telecommunications systems.

**quieting:** In an FM receiver, the phenomenon that results in less noise when an unmodulated carrier is present than when there is no carrier present. *Note:* Quieting is expressed in dB.

(this page intentionally left blank)